CLAIMS

1. A management engine for configuring and managing a cluster of virtualization switches, said management engine comprises:

a virtual management unit (VMU) for creating virtual volumes,

a graphical user interface (GUI) for allowing a user to perform at least graphical configuration operations and further displaying status indications, and

a data manager (DM) for facilitating communication with said virtualization switches.

2. A management engine, as per claim 1, further comprising a management database for maintaining at least management parameters of said virtualization switches.

3. A management engine, as per claim 2, wherein said management parameters comprise at least one of: Internet protocol (IP) address, user datagram protocol (UDP) port number, and identification (ID) name.

4. A management engine, as per claim 1, wherein said virtual volume is at least one of: simple volume, mirror volume, concatenate volume, strip volume, sub-disk, snapshot volume, and collection of virtual volumes.

5. A management engine, as per claim 1, wherein said VMU provides an abstraction layer of a storage network connected to said virtualization switches.

6. A management engine, as per claim 5, wherein said storage network comprises at least one of: optical drive, disk, and redundant array of independent disks (RAID).

7. A management engine, as per claim 1, wherein said cluster of virtualization switches operate in either one or both of: a storage area network (SAN) and a network attached storage (NAS).

8. A management engine, as per claim 1, wherein said virtualization switches are geographically distributed.

9. A management engine, as per claim 1, wherein creating said virtual volume comprises steps of:

 a. selecting storage devices to be included in each of said virtual volumes,

 b. determining the type of said virtual volume,

 c. exposing said virtual volume on said virtualization switch, and

 d. configuring volume parameters of said virtual volumes.

10. A management engine, as per claim 9, wherein volume parameters comprise at least: an identification (ID) name of said virtual volume, logical unit numbers (LUNs), and targets.

11. A management engine, as per claim 1, wherein said GUI displays a topology map of said storage network.

12. A management engine, as per claim 1, wherein said GUI displays the hierarchy of said virtual volumes.

13. A management engine, as per claim 12, wherein each of said virtual volumes is presented with an accompanying icon, said icon being representative of at least the type of virtual volume of said virtual volumes.

14. A management engine, as per claim 1, wherein said VMU generates a plurality of alerts.

15. A management engine, as per claim 14, wherein said alerts indicate at least: failures, status of said virtualization switches, and status of said cluster.

16. A management engine, as per claim 1, wherein said DM communicates with said virtualization switches through SNMP by exchanging management information base messages.

17. A management engine, as per claim 2, wherein said DM updates the content of said management database.

18. A management engine, as per claim 1, wherein configuring said cluster of virtualization switches comprises automatically applying volume parameters of a first virtualization switch connected in said cluster to a new virtualization switch added to said cluster.

19. A management engine, as per claim 3, wherein said management parameters are shared among all virtualization switches in said cluster.

20. A graphical user interface (GUI) for graphically configuring a cluster of virtualization switches, said GUI comprises graphical means for creating and configuring virtual volumes and graphical means for displaying at least said virtual volumes and a topology map of a storage network.

21. A GUI, as per claim 20, wherein said virtual volume is at least one of: simple volume, mirror volume, concatenate volume, strip volume, sub-disk, snapshot volume, and a collection of virtual volumes.

22. A GUI, as per claim 20, wherein said storage network comprises at least one of: tape drive, optical drive, disk, and a redundant array of independent disks (RAID).

23. A GUI, as per claim 20, wherein said cluster of virtualization switches operate in either one or both of storage area network (SAN) and network attached storage (NAS).

24. A GUI, as per claim 20, wherein said virtualization switches in said cluster are geographically distributed.

25. A GUI, as per claim 20, wherein said graphical means for creating virtual volume comprises selection means for selecting storage devices to be included in each of said virtual volumes.

26. A GUI, as per claim 25, wherein said graphical means for creating virtual volumes further comprises means for determining the type of each of said virtual volumes and means for exposing each of said virtual volumes.

27. A GUI, as per claim 25, wherein said graphical means for creating virtual volumes is a toolbar.

28. A GUI, as per claim 27, wherein said toolbar includes a plurality of functional buttons each defining a different function for the creation of said virtual volume.

29. A GUI, as per claim 28, wherein said functional buttons are perform at least the following functions: creating a mirror volume, creating a concatenation volume, creating a stripe volume, creating a transparent volume, exposing a virtual volume on said virtualization switch, and deleting a virtual volume.

30. A GUI, as per claim 20, wherein said graphical means for creating virtual volumes comprises at least one of: pop-up means, means to drag the selected physical storage devices, means for marking a portion of a storage device.

31. A GUI, as per claim 20, wherein said virtual volumes are hierarchically displayed.

32. A GUI, as per claim 31, wherein each of said virtual volumes is presented with an accompanying icon, said icon representing the type of said virtual volume.

33. A method for graphically configuring a cluster of virtualization switches, said method comprises the steps of:

a. graphically entering at least management parameters of a first virtualization switch in said cluster,

b. graphically creating at least one virtual volume to be exposed on said first virtualization switch, wherein the creation of said virtual volume is performed using a graphical user interface (GUI),

c. configuring at least volume parameters of said virtual volume,

d. entering at least management parameters of said new virtualization switch for each new switch, and

e. synchronizing said volume parameters of said first virtualization switch with said volume parameters of said new virtualization switch.

34. A method, as per claim 33, wherein prior to creating step, said method further comprises the step of discovering a topology map of a storage network connected to said first virtualization switch.

35. A method, as per claim 34, wherein said method is further operative for generating a plurality of alerts indicating failures occurring during at least the operation of said virtualization switch and the configuration of said virtualization switch.

36. A method, as per claim 33, wherein said management parameters comprise at least: internet protocol (IP) address of said virtualization switch, user datagram protocol (UDP) port number, identification (ID) name of said virtualization switch, administration information.

37. A method, as per claim 33, wherein said virtual volume is at least one of: mirror volume, concatenate volume, stripe volume, simple volume, sub-disk, collection of virtual volumes.

38. A method, as per claim 33, wherein said volume parameters comprise at least: virtual volume's identification (ID) name, logical unit numbers (LUNs), targets.

39. A method, as per claim 33, wherein graphically creating said virtual volume comprises the steps of:

a. selecting one or more storage devices to be included in said virtual volume,

b. determining the type of said virtual volume,

c. exposing said virtual volume on said virtualization switch, and

d. configuring said virtual volumes.

40. A method, as per claim 39, wherein the step of graphically creating said virtual volume is performed using graphical means, said graphical means comprises at least one of: toolbar, pop-up means, means to drag selected physical storage devices, and a means for marking a portion of a storage device.

41. A method, as per claim 33, wherein the step of synchronizing said volume parameters eliminates the need to configure each new virtualization switch installed in said cluster.

42. Computer executable code for configuring a cluster of virtualization switches, said code comprises the steps of:

a. graphically entering at least management parameters of a first virtualization switch in said cluster, the creation of said virtual volume is performed using graphical user interface (GUI),

b. graphically creating at least one virtual volume to be exposed on said first virtualization switch,

c. configuring at least volume parameters of said virtual volume,

d. for each new virtualization switch added to said cluster, entering at least management parameters of said new virtualization switch, and

e. synchronizing said volume parameters of said first virtualization switch with said volume parameters of said new virtualization switch.

43. Computer executable code, as per claim 42, wherein prior to said graphical creation step, said method further comprises the step of discovering topology map of a storage network connected to said first virtualization switch.

44. Computer executable code, as per claim 43, wherein said code is further operative for generating a plurality of alerts indicating failures occurring during at least: operation of said virtualization switch and configuration of said virtualization switch.

45. Computer executable code, as per claim 42, wherein said management parameters comprise at least: internet protocol (IP) address of said virtualization switch, user datagram protocol (UDP) port number, identification (ID) name of said virtualization switch, administration information.

46. Computer executable code, as per claim 42, wherein said virtual volume is at least one of: mirror volume, concatenate volume, stripe volume, simple volume, sub-disk, collection of virtual volumes.

47. Computer executable code, as per claim 42, wherein said volume parameters comprise at least: virtual volume's identification (ID) name, logical unit numbers (LUNs), and targets.

48. Computer executable code, as per claim 42, wherein graphically creating said virtual volume comprises the steps of:

a. selecting storage devices to be included said virtual volume,

b. determining the type of said virtual volume,

c. exposing said virtual volume on said virtualization switch, and

d. configuring said virtual volumes.

49. Computer executable code, as per claim 48, wherein the step of graphically creating said virtual volume is performed using graphical means, said graphical means comprises at least

one of: toolbar, pop-up means, means to drag selected physical storage devices, and means for marking a portion of a storage device.

50. Computer executable code, as per claim 42, wherein the step of synchronizing said volume parameters eliminates the need to configure each new virtualization switch installed in said cluster.

51. An apparatus for graphical configuration and managing a cluster of virtualization switches, said engine is comprised of:

a. a management engine executing configuration and managing operations,

b. means for graphical input,

c. means for graphical display, and

d. means for communicating with said virtualization switches.

52. An apparatus, as per claim 51, wherein said management engine is comprised of:

a. a virtual management unit (VMU) for creating virtual volumes,

b. a graphical user interface (GUI) for allowing a user to perform graphical configuration operations and further displaying status indications, and

c. a data manager (DM) for communication with said virtualization switches.

53. An apparatus, as per claim 51, wherein said graphical input means comprises at least one of: mouse, pointing device, touch screen, and keyboard.

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